

CLAIMS

1. A method for automatic dose control of one or more chemicals in a liquid treatment system, **characterized** in that the properties of liquid are used to modify the control surface of a linguistic equation (LE) controller adaptively by means of a predefined adaptation model to control the dosing of one or more chemicals to the liquid by one or more controllers.
2. The method of claim 1, **characterized** in that said linguistic equation is a dynamic linguistic equation.
3. The method of claim 1, **characterized** in that said linguistic equation is a static linguistic equation.
4. The method of any of the claims 1–3, **characterized** in that said linguistic equation is a non-linear linguistic equation.
5. The method of any of the preceding claims, **characterized** in that at least one of said controllers is a feedback controller.
6. The method of any of the preceding claims, **characterized** in that at least one of said controllers is a feedforward controller.
7. The method of any of the preceding claims, **characterized** in that the controller setup comprises one of more cascade controllers.
8. The method of any of the preceding claims, **characterized** in that said properties of the liquid are described by quality index.
9. The method of claim 8, **characterized** in that said quality index is purity index.
10. The method of any of the preceding claims, **characterized** in that said liquid is water.
11. The method of any of the preceding claims, **characterized** in that said liquid treatment system is a water purification system.

12. The method of any of the preceding claims, **characterized** in that said chemicals are coagulants, flocculants, oxidants, reductants, adsorbents, dispersing agents, biocides or defoamers or combinations thereof.

5 13. The method of any of the preceding claims, **characterized** in that said properties of liquid are defined from incoming liquid.

14. The method of any of the preceding claims, **characterized** in that said properties of liquid are defined from outgoing liquid.

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15. The method of any of the preceding claims, **characterized** in that said adaptation is performed by LE-model.

15 16. The method of any of the claims 1–15, **characterized** in that said adaptation is performed by fuzzy model.

17. The method of any of the preceding claims, **characterized** in that said adaptation is based on remote operation.

20 18. A device arrangement for automatic dose control of chemicals in liquid treatment system, **characterized** in that it comprises one or more adaptation models and controllers, and the properties of liquid are arranged to modify the control surface of a linguistic equation (LE) controller adaptively by means of a predefined adaptation model, to control the dosing of chemicals to the liquid by one or more
25 controllers.

19. The device arrangement of claim 18, **characterized** in that said linguistic equation is a dynamic linguistic equation.

30 20. The device arrangement of claim 18, **characterized** in that said linguistic equation is a static linguistic equation.

21. The device arrangement of any of the claims 18–20, **characterized** in that said linguistic equation is a non-linear linguistic equation.

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22. The device arrangement of any of the claims 18–21, **characterized** in that at least one of said controllers is a feedback controller.

23. The device arrangement of any of the claims 18–22, characterized in that at least one of said controllers is a feedforward controller.

5 24. The device arrangement of any of the claims 18–23, characterized in that the controller setup comprises one of more cascade controllers.

25. The device arrangement of any of the claims 18–24, characterized in that said properties of the liquid are described by quality index.

10 26. The device arrangement of claim 25, characterized in that said quality index is purity index.

27. The device arrangement of any of the claims 18–26, characterized in that said liquid is water.

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28. The device arrangement of any of the claims 18–27, characterized in that said liquid treatment system is a water purification system.

20 29. The device arrangement of any of the claims 18–28, characterized in that said chemicals are coagulants, flocculants, oxidants, reductants, adsorbents, dispersing agents, biocides or defoamers or combinations thereof.

30. The device arrangement of any of the claims 18–29, characterized in that said properties of liquid are defined from incoming liquid.

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31. The device arrangement of any of the claims 18–30, characterized in that said properties of liquid are defined from outgoing liquid.

30 32. The device arrangement of any of the claims 18–31, characterized in that said adaptation is arranged to be performed by LE-model.

33. The device arrangement of any of the claims 18–31, characterized in that said adaptation is arranged to be performed by fuzzy model.

35 34. The device arrangement of any of the claims 18–33, characterized in that said adaptation is based on remote operation.

35. The device arrangement of any of the claims 18–34, **characterized** in that it further comprises an intelligent analyzer.